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1 [High-speed local area networks and their performance: a survey](#)



Bandula W. Abeyesundara, Ahmed E. Kamal

 June 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 2

Publisher: ACM Press

 Full text available: [pdf\(3.83 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

At high data transmission rates, the packet transmission time of a local area network (LAN) could become comparable to or less than the medium propagation delay. The performance of many LAN schemes degrades rapidly when the packet transmission time becomes small comparative to the medium propagation delay. This paper introduces LANs and discusses the performance degradation of LANs at high speeds. It surveys recently proposed LAN schemes designed to operate at high data rates, including the ...

Keywords: access schemes, computer networks, data communication, medium access protocols, optical fiber networks

2 [Promises and reality: Server I/O networks past, present, and future](#)



Renato John Recio

 August 2003 **Proceedings of the ACM SIGCOMM workshop on Network-I/O convergence: experience, lessons, implications**

Publisher: ACM Press

 Full text available: [pdf\(225.62 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Enterprise and technical customers place a diverse set of requirements on server I/O networks. In the past, no single network type has been able to satisfy all of these requirements. As a result several fabric types evolved and several interconnects emerged to satisfy a subset of the requirements. Recently several technologies have emerged that enable a single interconnect to be used as more than one fabric type. This paper will describe the requirements customers place on server I/O networks; t ...

Keywords: 10 GigE, Cluster, Cluster Networks, Gigabit Ethernet, I/O Expansion Network, IOEN, InfiniBand, LAN, PCI, PCI Express, RDMA, RNIC, SAN, Socket Extensions, TOE, iONIC, iSCSI, iSER

3

[Massive High-Performance Global File Systems for Grid computing](#)



Phil Andrews, Patricia Kovatch, Christopher Jordan

November 2005 **Proceedings of the 2005 ACM/IEEE conference on Supercomputing SC '05**

Publisher: IEEE Computer Society

Full text available:  [pdf\(493.23 KB\)](#)

Additional Information: [full citation](#), [abstract](#)

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In this paper we describe the evolution of Global File Systems from the concept of a few years ago, to a first demonstration using hardware Fibre Channel frame encoding into IP packets, to a native GFS, to a full prototype demonstration, and finally to a production implementation. The surprisingly excellent performance of the Global File Systems over standard TCP/IP Wide Area Networks has made them a viable candidate for the support of Grid Supercomputing. The implementation designs and performa ...


4 VISA: Netstation's virtual Internet SCSI adapter



Rodney Van Meter, Gregory G. Finn, Steve Hotz

October 1998 **ACM SIGOPS Operating Systems Review , ACM SIGPLAN Notices , Proceedings of the eighth international conference on Architectural support for programming languages and operating systems ASPLOS-VIII**, Volume 32 , 33 Issue 5 , 11

Publisher: ACM Press

Full text available:  [pdf\(1.23 MB\)](#)

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In this paper we describe the implementation of VISA, our Virtual Internet SCSI Adapter. VISA was built to evaluate the performance impact on the host operating system of using IP to communicate with peripherals, especially storage devices. We have built and benchmarked file systems on VISA-attached emulated disk drives using UDP/IP. By using IP, we expect to take advantage of its scaling characteristics and support for heterogeneous media to build large, long-lived systems. Detailed file system ...


5 Switcherland: a QoS communication architecture for workstation clusters




Hans Eberle, Erwin Oertli

April 1998 **ACM SIGARCH Computer Architecture News , Proceedings of the 25th annual international symposium on Computer architecture ISCA '98**, Volume 26 Issue 3

Publisher: IEEE Computer Society, ACM Press

Full text available:  [pdf\(1.32 MB\)](#)

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Computer systems have become powerful enough to process continuous data streams such as video or animated graphics. While processing power and communication bandwidth of today's systems typically are sufficient, quality of service (QoS) guarantees as required for handling such data types cannot be provided by these systems in adequate ways. We present Switcherland, a scalable communication architecture based on crossbar switches that provides QoS guarantees for workstation clusters in the form of ...


6 Advances in high-speed networking



William Stallings

March 1996 **ACM Computing Surveys (CSUR)**, Volume 28 Issue 1

Publisher: ACM Press

Full text available:  [pdf\(163.21 KB\)](#)

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7

A high-speed network interface for distributed-memory systems: architecture and

**applications**

Peter Steenkiste

February 1997 **ACM Transactions on Computer Systems (TOCS)**, Volume 15 Issue 1**Publisher:** ACM PressFull text available: [pdf\(993.12 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#), [review](#)

Distributed-memory systems have traditionally had great difficulty performing network I/O at rates proportional to their computational power. The problem is that the network interface has to support network I/O for a supercomputer, using computational and memory bandwidth resources similar to those of a workstation. As a result, the network interface becomes a bottleneck. In this article we present an I/O architecture that addresses these problems and supports high-speed network I/O on dist ...

Keywords: I/O architecture, application-managed I/O, data reshuffling, distributed memory systems, network interface, outboard buffering, protocol processing, resource management

8 A cost-effective, high-bandwidth storage architecture

Garth A. Gibson, David F. Nagle, Khalil Amiri, Jeff Butler, Fay W. Chang, Howard Gobioff, Charles Hardin, Erik Riedel, David Rochberg, Jim Zelenka

October 1998 **ACM SIGOPS Operating Systems Review**, **ACM SIGPLAN Notices**, **Proceedings of the eighth international conference on Architectural support for programming languages and operating systems ASPLOS-VIII**, Volume 32, 33 Issue 5, 11**Publisher:** ACM PressFull text available: [pdf\(1.67 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper describes the Network-Attached Secure Disk (NASD) storage architecture, prototype implementations of NASD drives, array management for our architecture, and three, filesystems built on our prototype. NASD provides scalable storage bandwidth without the cost of servers used primarily, for transferring data from peripheral networks (e.g. SCSI) to client networks (e.g. ethernet). Increasing dataset sizes, new attachment technologies, the convergence of peripheral and interprocessor switch ...

9 FIPNET: a 10 MBPS fiber optics local network

William F. Giozza, Gérard Noguez

April 1982 **ACM SIGCOMM Computer Communication Review**, Volume 12 Issue 2**Publisher:** ACM PressFull text available: [pdf\(648.60 KB\)](#) Additional Information: [full citation](#), [references](#)**10** General storage protection techniques: The evolution of storage service providers: techniques and challenges to outsourcing storage

Ragib Hasan, William Yurcik, Suvda Myagmar

November 2005 **Proceedings of the 2005 ACM workshop on Storage security and survivability StorageSS '05****Publisher:** ACM PressFull text available: [pdf\(171.61 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

As enterprise storage needs grow, it is challenging to manage storage systems. The costs of locally managing, supporting, and maintaining resilience in storage systems has skyrocketed. Also, companies must comply with a growing number of federal and state legislations mandating secure handling of electronic information. In this context,

outsourcing of storage to utility-model based service providers has emerged as a popular and often cost-effective option. However, this raises issues related to d ...

Keywords: data protection, outsourcing, storage service provider

11 Standardization for ATM and related B-ISDN technologies



David Cypher, Shukri Wakid
September 1993 **StandardView**, Volume 1 Issue 1

Publisher: ACM Press

Full text available:  [pdf\(876.56 KB\)](#) Additional Information: [full citation](#), [references](#), [index terms](#), [review](#)

12 Session 6: networks (WAN/LAN): Performance of high-speed network I/O



subsystems: case study of a fibre channel network

Mengjou Lin, Jenwei Hsieh, David H. C. Du, James A. MacDonald

November 1994 **Proceedings of the 1994 ACM/IEEE conference on Supercomputing**

Publisher: ACM Press

Full text available:  [pdf\(854.32 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Emerging high-speed networks provide several hundred megabits per second to several gigabits per second of raw communication bandwidth. However, the maximum achievable throughput available to the end-user or application is quite limited. In order to fully utilize the network bandwidth and to improve the performance at the application level, a careful examination of I/O subsystems is essential. In this paper, we study one emerging high-speed network, the Fibre Channel network. The objectives of t ...

Keywords: I/O subsystem, fibre channel, host interface, performance evaluation

13 An efficient communication architecture for commodity supercomputers



Stephan Brauss, Martin Frey, Martin Heimlicher, Andreas Huber, Martin Lienhard, Patrick Müller, Martin Näf, Josef Nemecek, Roland Paul, Anton Gunzinger

January 1999 **Proceedings of the 1999 ACM/IEEE conference on Supercomputing (CDROM)**

Publisher: ACM Press

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14 Linux in education: integrating a Linux cluster into a production high performance computing environment



Helmut Degen

July 2001 **Linux Journal**, Volume 2001 Issue 87

Publisher: Specialized Systems Consultants, Inc.

Full text available:  [html\(26.55 KB\)](#) Additional Information: [full citation](#), [index terms](#)

15 Fastpath Optimizations for Cluster Recovery in Shared-Disk Systems



Randal Burns

November 2004 **Proceedings of the 2004 ACM/IEEE conference on Supercomputing**

Publisher: IEEE Computer Society

Full text available:  [pdf\(176.70 KB\)](#) Additional Information: [full citation](#), [abstract](#)

We describe the design and implementation of a clustering service for a high-performance, shared-disk file system. The service provides failure detection and recovery, reliable end-to-end messaging, and a centralized and recoverable management interface. We implement novel optimizations in the voting protocol that resolves cluster membership. Optimizations allow clusters to form as quickly as possible without introducing livelock or requiring timeout parameters to be tuned carefully. Our treatment ...

16 Network management viewpoints: a new way of encompassing the network




management complexity

Simon Znaty, Jean Sclavos

July 1994 **ACM SIGCOMM Computer Communication Review**, Volume 24 Issue 3

Publisher: ACM Press

Full text available:  [pdf\(1.58 MB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

This paper defines viewpoints in order to deal with the network management complexity. A network management viewpoint leads to the representation of a network management system with emphasis on a specific concern. Five viewpoints are identified, namely information, functional, communication, architectural and organizational. The network management standards provisions and lacks for every viewpoint are enhanced and some elements of solutions are presented. Then, these viewpoints are integrated an ...


17 High-speed switch scheduling for local-area networks



Thomas E. Anderson, Susan S. Owicki, James B. Saxe, Charles P. Thacker

November 1993 **ACM Transactions on Computer Systems (TOCS)**, Volume 11 Issue 4

Publisher: ACM Press

Full text available:  [pdf\(2.37 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Current technology trends make it possible to build communication networks that can support high-performance distributed computing. This paper describes issues in the design of a prototype switch for an arbitrary topology point-to-point network with link speeds of up to 1 Gbit/s. The switch deals in fixed-length ATM-style cells, which it can process at a rate of 37 million cells per second. It provides high bandwidth and low latency for datagram traffic. In addition, it supports real-time t ...

Keywords: ATM networks, iterative matching, statistical matching, switching scheduling


18 Microarchitecture of a High-Radix Router



John Kim, William J. Dally, Brian Towles, Amit K. Gupta

May 2005 **ACM SIGARCH Computer Architecture News , Proceedings of the 32nd Annual International Symposium on Computer Architecture ISCA '05**, Volume 33 Issue 2

Publisher: IEEE Computer Society, ACM Press

Full text available:  [pdf\(342.21 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

Evolving semiconductor and circuit technology has greatly increased the pin bandwidth available to a router chip. In the early 90s, routers were limited to 10Gb/s of pin bandwidth. Today 1Tb/s is feasible, and we expect 20Tb/s of I/O bandwidth by 2010. A high-radix router that provides many narrow ports is more effective in converting pin bandwidth to reduced latency and reduced cost than the alternative of building a router with a few wide ports. However, increasing the radix (or degree) of a r ...


19 High availability path design in ring-based optimal networks



Wayne D. Grover

August 1999 **IEEE/ACM Transactions on Networking (TON)**, Volume 7 Issue 4

Publisher: IEEE Press

Full text available:  pdf(308.91 KB) Additional Information: [full citation](#), [references](#), [index terms](#)


20 A case for packet switching in high-performance wide-area networks



Z. Haas, D. R. Cheriton

August 1987 **ACM SIGCOMM Computer Communication Review , Proceedings of the ACM workshop on Frontiers in computer communications technology SIGCOMM '87**, Volume 17 Issue 5

Publisher: ACM Press

Full text available:  pdf(915.56 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The large capacity of optical fibers suggests that circuit-switching may become a more attractive switching method in future communication networks. We show, however, that under some reasonable assumptions the delays associated with circuit-switching make the technique inferior to packet-switching in a high-performance, distributed environment. A network design that demonstrates the feasibility of packet-switching in high-performance environment is also presented. This work was s ...

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